Recording and Handling Data

APPLICATION

This section provides guidelines that are to be followed when recording raw data, performing reduction and validation of data, and reporting results.

DATA RECORDING

The rules for recording data and commentary on data in laboratory notebooks, data forms, and other media are intended to ensure legibility, accuracy, validity, and clarity of meaning.

General Guidelines

Legibility - All entries must be legible.

Recording Entries - All entries shall be made using black or blue ballpoint pen. Water-soluble ink must not be used. No pencil, felt tip, or red ink is permissible.

Initialing an Entry - The originator(s) of all entries must be identified by initial(s) or signature(s). In most cases, there are specific places on the data sheet for initials to identify the originator of entries or groups of entries.

No-Data Entries - All blanks with no data must contain a short horizontal or diagonal line.

Abbreviations - The use of abbreviations should be kept to a minimum. Only nationally accepted abbreviations (i.e., NaOH, HCl) may be used without further clarification. Other abbreviations can be used providing the abbreviation can be traced to a corresponding abbreviation explanation.

Errors - Cross out with a single line so as to remain legible. Do not erase, write over, or use correction material. Each cross out will be initialed and dated. If the reason for the change is not obvious, then the reason must be stated. If there is insufficient space for all or part of the correction information, enter a footnote callout near the incorrect data and enter the required information as a comment elsewhere on the data sheet, notebook page, etc.

Laboratory Notebooks

The cover of each notebook shall be identified with the study name and the responsible person. Record as the first entry: project title, brief description of the objectives of the project, and list of all person(s) making entries in the book by printing their names with corresponding initials and signatures.

Project documentation must be entered legibly, and in sufficient detail as to permit repeating of the work other than the technician originally performing the activity. Each page must be dated by the month, day,

and year in which the data were recorded and signed by the person(s) performing the work or entering the data.

Record observations/data chronologically. Describe (narrative or sketch) observations, experimental apparatus, equipment, materials, calculations and any procedures, data sheets, etc. that are used.

Use the following steps if it is necessary to attach a loose sheet to the notebook: attach the sheet to an unused page or portion of a page with tape, sign and date the sheet, identify on the sheet the notebook number and page number to which it is attached (in case it comes loose), and take an entry in the notebook to introduce or describe the attached sheet.

Record as the last entry for a project a statement noting completion of the work or, if appropriate, reference to a subsequent notebook.

DATA MANAGEMENT PROCEDURES

All data shall undergo a thorough internal review by the responsible supervisors and the quality assurance officer. These personnel are responsible for checking the package for completeness and accuracy. Routine items to be verified include ensuring the following:

Calibrations meet the criteria specified in the procedures.
All analyses are within calibration curve range.
QC samples meet acceptance criteria.
Data meets established data quality objectives.
All calculations are correct.

All deviations from the procedures are documented and approved by the project manager.

The staff member entering the data shall assure correct entry into the software by comparing data with the hard copy of the data listing, or double entry. If errors are discovered, the errors shall be corrected and a new data listing generated. When data are correctly entered, the staff member entering the data shall initial the correct data listing and note whether it was double entry or verified.

Data entered on this software shall be backed up on a daily basis or more frequently as needed.

Manipulations of data within the spreadsheets shall be verified with randomly chosen hand calculations. These calculations shall be documented directly on the printouts or shall be traceable to the printouts and shall be checked as a primary verification of accuracy and completeness. Qualified persons who do not participate in performing the calculations shall perform checking and document with initials and date on the printout. Separate documentation is acceptable, provided traceable records are maintained.

HANDLING UNACCEPTABLE OR SUSPECT DATA

When the initial data review identifies suspect data, that data must be investigated to establish whether it reflects true conditions or an error. The investigation shall be documented. If the data value is determined to be in error, the source of the error must be investigated, the correct value established if possible, and the erroneous value replaced with the correct value. If the investigation concludes that the data are suspect (possibly in error) but a correct value cannot be determined, the data must be flagged to indicate its status.

DATA HANDLING

Standard Units - All data must be reported in consistent units to allow comparability of databases among organizations. Where appropriate, the mean and standard deviation should be reported. The standard units used to report data are listed below.

pH	pH units
Salinity	‰
Temperature	°C
Dissolved Oxygen	mg/L
Ammonia	% unionized NH_3
Sulfide	H_2S mg/L